Hobbies WEEKLY

CONTENTS

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Patterns for a novelty Wheeled Toy

THE BARROW BOY

HERE is another attractive toy to make up. Most woodworkers, we think, have a collection of odd pieces of wood of different thicknesses which might be used up for making toys. Any variety of wood can be used for this purpose as, in most cases, paint is incorporated to make a suitable covering to hide the colour and grain of any wood.

The illustration below gives a good idea of the toy which we are about to describe and make up. As will be seen, the barrow is fashioned along the lines of an ordinary fruit or flower display truck, commonly seen in the market places of our cities.

The man is pivoted between the handles of the barrow, and is fixed to a base having two small wheels, enabling the whole unit to move freely.

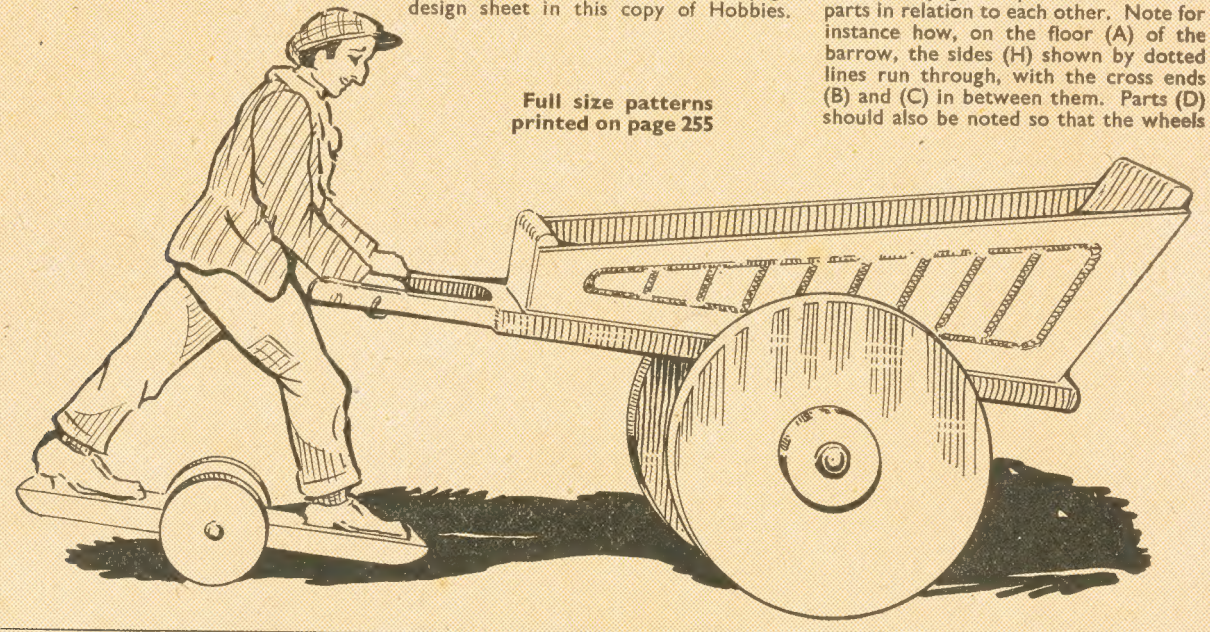
Printed Parts

In making this toy the worker will have the advantage of the full-page design sheet in this copy of Hobbies. Here are included patterns, all full-size, of every part, and he may stick these down direct to the wood or make a tracing of each and transfer the outline to the wood by means of carbon paper. This latter course enables the worker to keep his copy of Hobbies intact and without cutting.

Full size patterns printed on page 255

Hints on Building

It would be a good plan before commencing to make up the toy to go over the page of patterns, and note parts in relation to each other. Note for instance how, on the floor (A) of the barrow, the sides (H) shown by dotted lines run through, with the cross ends (B) and (C) in between them. Parts (D) should also be noted so that the wheels



will eventually come in their proper place.

The pivot wire holding the hands of the man should also be noted and checked so that the holes running through the handles to take the wire are square across.

The first part to cut out will, naturally, be the floor (A), and wood $\frac{5}{16}$in. thick would answer for this. After cutting round, clean off the cut edges with glasspaper, and then lay it aside while the two sides (H) and the ends (B) and (C) are cut out. Glue (B) and (C) between the sides and drive in one or two fret pins to strengthen the joints.

Then glue the whole to the floor and again put in a few pins from beneath to make a really strong job. It will be noted that one side (H) only is included on the pattern sheet. The second side is got by drawing round the first cut-out side after its edges have been lightly glasspapered and made smooth.

Axle Supports and Bar

The axle supports (D) will be $\frac{3}{8}$in. thick and treated the same, the hole for the axle bar being slightly larger than $\frac{1}{4}$in. to accommodate a length of $\frac{1}{4}$in. diameter rod. A better result than cutting the holes in (D) would be to drill them with a $\frac{1}{4}$in. twist bit, running through the two pieces (D) at one time for sake of accuracy.

The axle bar will in this case only need a light papering to allow it to move freely in the supports. The wheels are to be $2\frac{1}{2}$ins. in diameter and should be of $\frac{1}{4}$in. wood. At (I) on the pattern sheet, part only of a wheel is given, and from this, using the centre dot shown, the arc of the wheel may be struck with a pair of compasses. The dotted line on (I) shows where the outer disc (J) forming the hub of the wheel will be glued.

Axle Rod

The axle is a piece of $\frac{1}{4}$in. rod as previously mentioned, 4ins. long. One wheel and its hub is glued on this, then the axle is threaded through the supports (D) and the second wheel and its hub glued on. There should be a clearance of $\frac{1}{8}$in. at least between each wheel and the edge of the floor so that the barrow may run freely. The discs shown as (J) on the pattern sheet are for the hubs of the wheels, and same will be used for the wheels of the figure of the man, see the sketch of the finished article.

Figure Base

The base for the figure is shown as (E) on the pattern sheet, and it should be cut from $\frac{5}{16}$in. wood. Shape off the front and back edges of the base so that it will run smoothly should it come in contact with the floor. Bore a hole through the centre of the base for an axle wire, as shown by the dotted lines, or if desired the wheels could be put on with large-head wire nails; this latter is, perhaps, the quickest and easiest method.

Some careful cutting is necessary if the figure is to look effective. The body and legs should be cut from $\frac{3}{8}$in. wood and the arms from $\frac{1}{4}$in. wood. Trace the outlines carefully and transfer them to the wood or, the patterns may be stuck to the wood direct. The head and neck could be carved slightly if desired to give a natural effect, or the paint could be used to give this effect.

Cut two of the arms and glasspaper the edges and shape where the shoulders come. Bore holes through the hands for the wire connection between these and the handles of the barrow. Turn down the projecting ends of the wire on the outside of the handles.

Finishing Points

The wheels for the figure will be to the same diameter as discs (J) but small holes will be made in the place of those larger ones shown.

The whole toy should be painted up in bright colours; green or red for all four wheels, black or brown for the base of the figure and for the floor of the barrow. The picture of the toy shows how contrast can be got in painting the clothes of the figure; here again some bright colouring can be introduced. Two coat work in painting on the colour will give a much better effect than the one coat. Let the first dry thoroughly before applying the second.

Some Helpful Radio Replies—

Motor Usage

CAN I run a converted ex-Govt. electric motor 220v. A.C. from 250v. A.C.? If not, what could I use to drop the 30 volts? The motor I have in mind is type 47 G.M. with gear box and blower. (J.S.—Sutton-in-Ashfield).

IT is not possible to state what resistance is required to drop the unrequired 30 volts, because this depends upon the current consumption. Probably a lamp or wire-wound resistance of about 30 ohms would be suitable, but as the drop in any resistance depends upon the current flowing, this is only approximate.

Another method would be to use a 250/220 volt transformer, but this would be much more expensive. A suitable resistance could be found by trial; if the value tried is too large, the motor will run slowly; if too small, it will run at high speed and tend to overheat.

* * *

Voltage Usage

I HAVE fitted a pilot lamp on my radio set, using a 2·5v. bulb. I am taking the voltage for this off the two filament terminals of the last valve. I wondered whether this would run the accumulator down very quickly without giving any amount of 'juice' to the set. Is there any way I could run it off the H.T. battery, etc.? (R.H.—Nottingham).

YOUR present method of connecting the pilot lamp is correct, and it would be very uneconomical to take current from any battery other than the accumulator.

The ordinary 2·5 volt torch bulb consumes rather a high current (as much as two or three valves) and it would be better to use one of the special low-consumption dial-light bulbs obtainable from good radio stores (also sometimes found as fuse bulbs in Woolworths Stores).

If the light is used for tuning only, and current consumption is to be as small as possible, a simple on-off switch can be wired in series with the bulb so that it can be switched off when not required.

* * *

Series Aerial Condenser

COULD you tell me where and how a series aerial condenser would be used, and to what advantage? (A.L.—Holbury).

A SERIES aerial condenser is connected in series with the aerial lead-in wire where the latter joins on to the receiver. Its capacity depends upon the purpose and type of receiver, and is usually between ·0001 and ·0003 mfd. Frequently a pre-set or variable condenser is used, as this can be adjusted to different capacities to find which is most suitable.

In effect, the condenser reduces the damping the aerial imposes on the tuned circuit. This makes sharper tuning possible. The lower the capacity, the sharper will tuning become. Unfortunately volume is reduced as capacity is lowered, so that a balance between selectivity of tuning and volume must be struck, and volume should be restored as far as possible by increasing reaction or amplification by means of the receiver controls.

* * *

Crystal Valve's Function

IF constructional and functional details on a crystal valve are to hand, I would be greatly interested. (A.F.—Edinburgh).

THE crystal valve may be regarded as a crystal detector, and any crystal set circuit can be used without modification. In past issues of *'Hobbies Weekly'* various suitable circuits have been described, and any of these would be fully satisfactory.

The sole advantage of this part is that it does not require to be adjusted to a sensitive spot, as with a crystal and catswhisker detector. It cannot be made up at home.

Any lady would be delighted to have this
DRESSING TABLE LAMP

THIS is a really interesting piece of work to undertake, and the result should be most pleasing, as our illustration Fig. 1 shows. The finished article could be used for the dressing table or the bedside table, and as regards colour or finish, this depends largely on the kind of wood used in its construction. As will be seen from Fig. 1, there is an oblong box with lid to open from the front and, if desired, with front to let down, making, in this latter case for convenience in handling the contents.

There is, however, no need to have an opening front, as the inside is easily got at by raising the main top lid. The whole construction of the box is very simple, as Fig. 2 will show, and here are given the various parts all lettered up corresponding with the cutting list which is given at the end of this article.

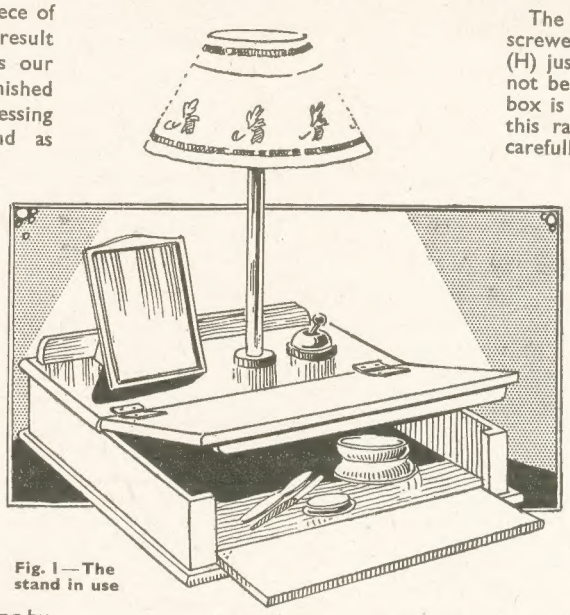


Fig. 1—The stand in use

Box Framework

The actual box measures 12ins. long by 7½ins. wide by 3ins. deep. These dimensions, of course, may be varied to suit any particular size or shape dressing table or bed-side table. The box, as can be seen from Fig. 2 consists of floor (A), two sides (B), two ends (C), partition (D), the lid (E) and (F), and a pediment rail (G).

The floor and the lid are identical in length and finish and the latter means that the edges of both pieces are rounded off smoothly. The sides and ends of the box are shown simply butted together and glued, and to help this simple jointing, small square or triangular fillets of wood should be glued in the angles inside.

A better and stronger method of jointing the sides and ends would be to pin joint them, or in other words form open mortise and tenons which fit one within the other, which obviously glue well and strongly together. For this form of jointing, however, the cutting must be carefully and accurately carried out.

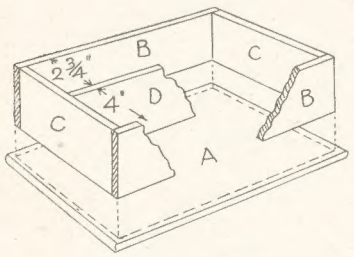


Fig. 2—Box construction

The Hinged Front

If the front of the box is to be made to open downwards, as Fig. 1, then a space of 1in. at each end of the front part (B) should be marked off and cut down and the larger piece hinged to the floor with ¾in. brass hinges. The piece of wood for the lid will be marked off, as shown in Fig. 3, and cut through on the line, and the two parts then connected by a pair of ¾in. hinges.

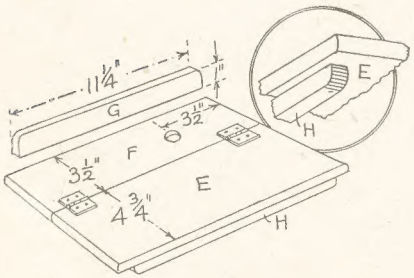


Fig. 3—Details of the hinged top

The pediment rail (G) is glued on and screwed from beneath. The small rail (H) just under the front of the lid will not be included unless the front of the box is made to fall down. The ends of this rail and also the rail (G) will be carefully rounded off and made smooth ready for painting or for other finish. A hole must be cut in the back portion of the top to take a length of tubing to connect up with the bulb of the lamp.

It should be noted here that the back also is screwed to the sides and back of the box with round-head brass screws to facilitate removal when a new battery is needed inside the box.

Bulb Holder

On the floor of the box, and immediately below the hole previously mentioned, there is fixed a disc into which to fit the metal tubing. A similar disc is glued on the top of the box, the tube passing through it as shown.

To form a fixing for the bulb holder which may be purchased ready-made and with the necessary points to which the flex may be attached, the tube is cut down at the top end and the two 'leaves' turned down or folded back and then drilled, as the detail Fig. 4 shows. Two holes are next drilled in the tube at about 2ins. up from its base for the flex to pass through on its way up to the top.

The arrangement of the batteries and the method of wiring is shown in Fig. 4. The batteries lie to the left of the lamp and in the corner of the box, being held in place there by two small-section wood fillets.

Switch Contact

The switch may be either fixed to the top of the box or on the right hand side of it whichever is thought to be most convenient. A brass or copper contact

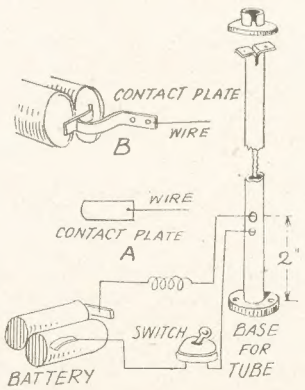


Fig. 4—Theoretical circuit of lamp

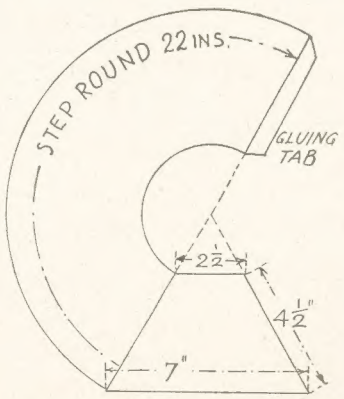


Fig. 5—Making the lamp shade

plate is fixed to the floor of the box just where the batteries will rest. The raised contact piece on the batteries will meet the plate which has one of the flex wires attached to it, see enlarged detail at (A) in Fig. 4.

A further contact plate may be fixed to the back of the compartment to form contact with the other brass strip on the battery. This contact plate is cut and bent up, as at (B), Fig. 4, and screwed in place and another wire attached for connecting up to the lamp.

Shade Holder

A simple form of lamp shade holder can be made by first twisting a length of stout wire round the metal tubing and then fixing or soldering a wire ring to it at the top for the shade to rest upon. The length of wire needed and the size of the ring will all depend upon the size and type of lamp shade adopted.

Lamp shades of all shapes and sizes can generally be bought, and it may not, therefore, pay to make up one, having to purchase in the first place suitable parchment paper, silk cord, etc. For those workers, however, who desire to have their article entirely home-made, and much more value seems to attach to such an article—we illustrate a method of setting out a cone to any given required measurements.

Making the Shade

If, for instance, a shade is wanted, say, 7ins. in diameter and with a slope of 4½ins., as outlined in the diagram Fig. 5, we proceed to work as follows. We shall first require a piece of lamp shade paper measuring 12ins. by 7ins., or thereabouts. On a spare piece of commoner paper set out the outline of the cone to the dimensions suggested above.

CUTTING LIST

Floor (A)—12⅜ins. by 7⅜ins.
Sides, 2 (B)—12ins. by 2½ins.
Ends, 2 (C)—7ins. by 2½ins.
Partition (D)—11½ins. by 2½ins.
Lid (E)—12⅜ins. by 3½ins.
Lid (F)—12⅜ins. by 4⅜ins.
Pediment (G)—11½ins. by 1in.
Rail (H)—11½ins. by ½in.

Continue the slope of the sides until they meet at a point which will result in the triangle shown. At the apex put in the point of the compass and draw the two circles from the two points 4½ins. apart. Now, knowing that the circumference of a circle equals 3⅐th times its diameter, step round with a pair of dividers or a measuring strip twenty-two 1in. spaces on the outside or larger arc of the two circles.

Connect the final point with the centre or apex of the triangle and thus complete the segment. Allow ½in. or a little more, perhaps, at the end of the piece as a gluing tab when the paper has been bent round into a cone. Some handwork in water colour or oil may be added as desired to decorate the shade and a row of stitching run round the edge at the bottom, perhaps, to hold the stiffening wire at this part.

The woodwork of the lamp should be finished off nicely by polishing or painting. There will be a useful space on top of the box at the back for standing a small dressing mirror which should nicely catch the light from the lamp.

TWO NOVEL FIGURE DOOR STOPS

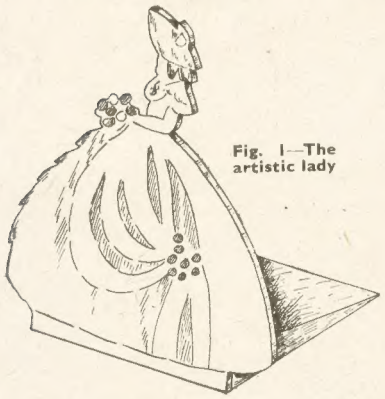


Fig. 1—The artistic lady

THE two door stops here described are novel in design, quite easy to make from odds and ends of wood, and when coloured with enamel paints look very attractive and artistic.

The lady indicated by Fig. 1, of the accompanying illustrations, is well worth making, and is constructed in the following manner. Obtain a piece of sound wood ⅜in. thick, cut it to size 6ins. by 5ins., and mark one face into ½in. squares. Now draw the shape of the lady on the wood which is quite simple, as indicated in Fig. 3, by following the outline through the squares. The markings for the dress may lightly be made for a guide for coloured enamel.

The figure should then be carefully cut out with a fine fretsaw, taking care to keep the edge square.

The Puppy doorstop, illustrated in Fig. 2, is very novel and attractive and is also quite simple to cut out. This is cut from wood ⅜in. thick, size 6ins. by 5ins. in the same manner as treated for the lady. Details of the puppy design are given in Fig. 4, and the outline is drawn by the aid of the ½in. squares already marked on the wood face, as described for the lady.

The Base

The base is common for both. Obtain sound wood ½in. thick and free from cracks. Cut to size 3½ins. by 3ins. and taper the top face ¾in. from the front edge to form a wedge. You can do this best with a small plane or a file.

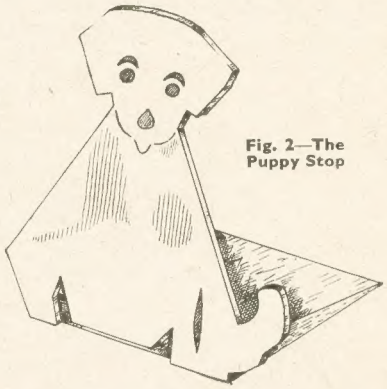


Fig. 2—The Puppy Stop

Having made a base for each figure, the lady and puppy are fixed in position by means of a little glue and two or three small panel pins. When fixing the figures take care to get them square on the front edge of the base. The doorstops when made should be well smoothed and the base finished off with dark stain.

The figures themselves are neatly painted with coloured enamel paint, and both lady and puppy lend themselves to artistic treatment according to one's own choice. Choice colours make an artistic and bright effect.

Fig. 3—Outline of the female figure to draw out

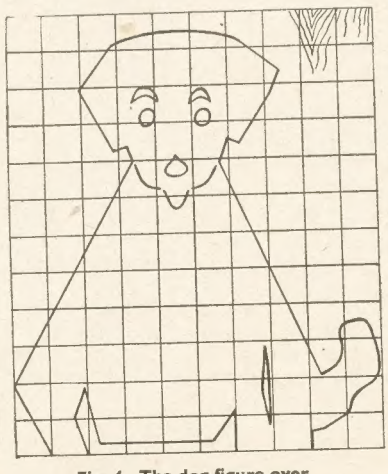


Fig. 4—The dog figure over ½ inch squares

Pictures and panels in colour can be built up by means of

WOOD MARQUETRY

MARQUETRY is a most artistic decoration to apply to home-made furniture, especially those articles designed with panels and such-like flat surfaces. Simple marquetry is not difficult and a panel, as that illustrated, quite free from complicated twists and twirls of foliage, serves as a good introduction to the art.

Fig. 1 shows the suggested panel, using four different coloured woods. A key to these is given, (A) being sycamore or holly; (B) satin walnut or other light wood; (C) light mahogany; (D) dark walnut. If the reader can obtain other woods of the rarer species, all the better, as long as a good contrast in tones is obtained.

Veneer

Veneer is used for marquetry, the effect being of a complicated inlay to the uninitiated. Knife-cut veneers can be used, but the beginner might prefer the saw-cut ones as being less fragile to handle. No particular tools need be bought, as a simple press can be made at home, and the ordinary fretworker's equipment will provide the rest, with such other woodworking tools as the average handyman can reasonably be expected to possess.

With regard to the press. This should

Fig. 1—A panel of four woods

be large enough to cope with any size panel likely to be used. A sketch of one is given at Fig. 2, from which it will be seen that it is composed of a pair of stout wood boards, the top one battened across each end, and both provided with one or two strong steel cramps each side, to exercise pressure. Provided with these and the necessary veneers, work can be commenced on the job.

The first thing to do is to make a full size drawing on thin white paper of the design. As the border is to be applied afterwards, this can be omitted from the drawing. The veneers are to be fixed together with a sheet of stout brown paper glued between each, as at Fig. 3. The glue should be thin and hot, not of the consistency required for the usual jointing job. When glued, press in the clamp until the glue is set.

The resulting panel should then be stiff enough to safely handle. A good plan here is to lay intermediate veneers with their grain at right-angles to those above and below; it helps to counter any tendency to warp. Another thing, the varied directions of the grain of the woods impart a pleasing variety to the work.

Cutting

Now paste the design on the panel, and when dry saw the design out. As the pieces are cut, lay them aside carefully and do not get them mixed up. Use the finest of saw blades for the work, and the smallest possible holes for the blade to enter, and drill the necessary holes in the least conspicuous positions. When all are cut, separate the layers by dividing them with a thin bladed knife. The unwanted pieces can be laid aside, the rest arranged in the panel in their correct positions.

Care must, obviously, be used in separating delicate pieces. Mostly they should part fairly easily, but if any are inclined to be obstinate, a little steaming will help, or they can be laid between wet blotting paper in the press for a few hours. The latter is the better method, but takes longer.

With a simple design like the one sketched, especially if saw-cut veneers are used, the whole can be glued straight away to the wood or plywood panel to be decorated. The design should first be trimmed at its edges to the finished size, and a pencilled area marked on the

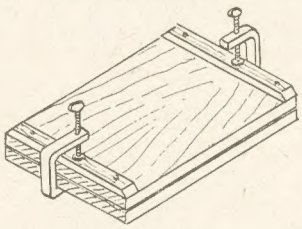


Fig. 2—A simple press

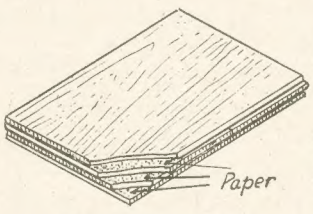


Fig. 3—Layers of work

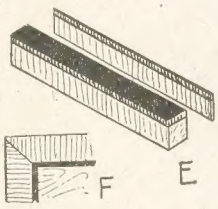


Fig. 4—Border strips

plywood as a guide.

The glue is then applied to the plywood and to the underside of the parts, and all arranged correctly and pressed down to the wood. Leave the margin spaces free for the border to be applied later. When glued, cover with several thicknesses of newspaper, and cramp up tight in the press.

Two methods of making up the border are suggested. For one cut a thick strip of the mahogany, with the grain running across the strip, not lengthwise. To the end of this glue a thin strip of darker wood, walnut would serve, and cramp up.

When set, thin slips can be sawn off, as at Fig. 4 (E). Alternatively, if knife-cut veneers are used, strips of the actual veneer can be sawn across and used instead. Thinner strips of the darker wood are laid side by side with these, and both held together with a paper strip glued on top.

Remove the panel from the press, and clean off any glue that has squeezed out from the veneered design that might prevent a close fit between border and panel. Cut the border strips to length and try in place. Mitre them neatly at the corners. When all are closely fitted, lift them off and glue them back again. Then press once again until the glue is hard.

The next part of the work requires some little patience, as the paper and glue must be removed from the veneers to reveal the design. With saw-cut veneers some of this unwanted stuff can safely be removed with a smoothing plane, well sharpened and finely set. Use great care at the corners to avoid breaking the tips of the veneers.

Cleaning

With knife-cut veneers, the wood is too thin for this and resource must be had to the cabinet maker's scraper or even glasspaper. The latter is not too popular for such work, at least not at this stage, as it soon clogs and becomes useless, besides, the work of removing the glue becomes rather tedious.

A well sharpened wood scraper is about the speediest tool, except the plane, of course, and is also the safest. When all glue and paper are off, an examination of the work should be made and any cracks and gaps made good with stopping, coloured to match the woods. In the design the black portions (stockings and tuft of hair under cap), can be stained, if the stain is carefully applied.

Small features such as the eye of the figure and marks of the bow of apron, can be put in with indian ink. If the parts are touched up with a little size beforehand the ink is unlikely to run.

The design should be made smooth with glasspaper, however, before any staining or marking is attempted. The panel can then be fitted in its permanent position and be french polished or coated with a clear varnish. A high gloss is not always to be preferred, and some readers may care to choose a thin glaze instead as showing up the design better.

Whichever method is undertaken, it is worth spending as much time over the process as the actual making. Too many workers ruin their handiwork by slovenly finish.

The handyman would do well to learn about

RIVETING GLASSWARE

TO be able to repair china and glass in a satisfactory manner is a great asset these days. It is still none too plentiful, besides which the price very often makes an article prohibitive. The repairing of china and glass is a craft that is rapidly dying out and there is a grand opportunity for anyone to learn and carry on this splendid hobby with considerable success and financial gain.

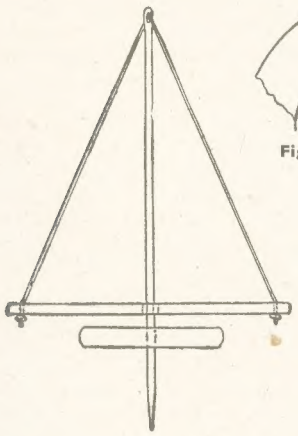


Fig. 1—The completed drill needed

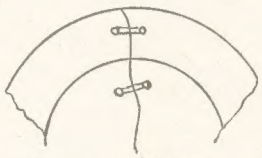


Fig. 2—A riveted plate

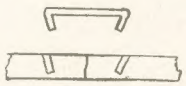


Fig. 3—Rivet shape and position

It is a job that can be done anywhere and the tools and materials required are simple and few. The most important tool is a drill of a special type and not used for any other purpose. There is no need to buy one (even if that is possible now), as it is not difficult to make one.

The Main Rod

A piece of steel or brass rod 12ins. long and ¼in. diameter is needed. It is possible to make it from dowel rod, but this would not wear so well. As a glance at Fig. 1 will show, this rod forms the rotating spindle of the drill and has a hole drilled in the top, while the other end is somewhat pointed. It is over this end that a tin tube holding the diamond drill is fitted.

About 2ins. up, a wooden disc is fixed tightly to act as a balance. Size is not important, but it must be heavy enough to keep the spindle turning. A bar of wood about 8ins. long has a hole cut in the centre so it will slide up and down the spindle quite esaily.

A small hole is also drilled near each end, and a leather shoe lace threaded through these holes and also the hole in the top of the spindle. Knot the two ends so that when the bar is at rest it is about ½in. above the balance weight.

Motion is given to the drill by twisting the spindle a few turns so that the bar rises. Then with a light pressure of the fingers press the bar down and when near the bottom release the pressure but still holding the bar lightly and let it rise by the momentum of the spindle. Continue this cycle of events and the drill will then be spinning merrily.

The Drill

For the cutting part there are quite a variety of bits that can be used. Undoubtedly the best is a small piece of diamond called a spark, and this you may be able to get from a jeweller. A piece of sheet tin is coiled up to fit on the pointed end of the drill with the diamond set in the small end and the edges burnished over to keep it in.

The bottom part of this tin tube should be filed parallel for about ¼in. and not left tapered like the rest of the tube. There will be enough spring in the tin to hold it tight on the pointed end of the drill.

The writer has used other materials besides diamonds with quite good results, such as chips of flint and other stone. Good results are possible with a piece of hard steel wire broken off to leave a rough edge.

Having got the drill made we are now ready to try a repair job, say, a broken plate, as shown in Fig. 2. Place the two pieces together and with a pen and ink make dots where you want holes drilled. They should not be less than $\frac{3}{16}$in. from the break on either side or the job will be considerably weakened.

Now with the point of an old three-corner file carefully chip off the glaze. We can then start drilling, lubricating the hole well with turpentine. The holes should be drilled to point towards the break slightly, as shown in Fig. 3. The job should be rested on a pad or cloth bag filled with sand while drilling.

Do not drill right through, about three-quarters of the way is sufficient. Clean the holes thoroughly by washing in warm soapy water and dry well.

A piece of half-round brass or white metal wire is then cut and bent as in Fig. 3, so it will snap in to the two holes and in so doing will hold the two pieces together. A small plate or saucer broken into two will need 3 or 4 such rivets to hold it together securely; more complicated breaks will require more.

Mix a small quantity of plaster of paris and water into a creamy paste and rub into the holes, along the rivet and also into the join to fill up all cracks. Then put aside to dry.

Watertight

If the article is to hold water it can be made tight by cementing the pieces before inserting the rivets. A thick solution of gum arabic and water is stirred with plaster of paris to form a cream and applied to the edges. Leave for about three days to set properly.

Another very satisfactory way is to paint the edges with a good white lead paint or a good varnish and allow plenty of time for drying.

Good waterglass, which is really sodium silicate, makes an excellent join, but the pieces should be warmed before applying this and afterwards well heated in order to dry the cement.

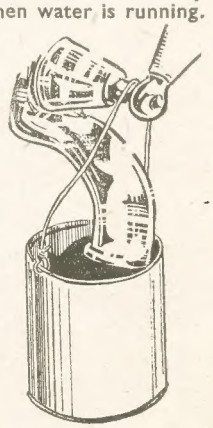
Catch That Drip!

THE old proverb tells us that 'constant dripping wears away a stone'. There may not seem much force behind a small drop of water, but when thousands of drops fall on the same spot, their cumulative force is surprising.

In a great number of bathrooms one can see quite clearly where the hard enamel on the bath has been slowly but surely eroded by dripping water.

Of course, a really bad leak calls for a re-washering of the tap. This is a simple enough job, described in all home-repair manuals, and, in fact, many waterworks companies will rewasher a tap free of charge. But it is of the tiny drips with which we are concerned—usually caused by a tap that has not been completely screwed down.

All that is necessary to stop the trouble is to get a tin can and make a handle for it from wire, to hang over the tap as shown in the sketch. Have the wire so adjusted that the can is easily swung one side when water is running. The can need not be removed.

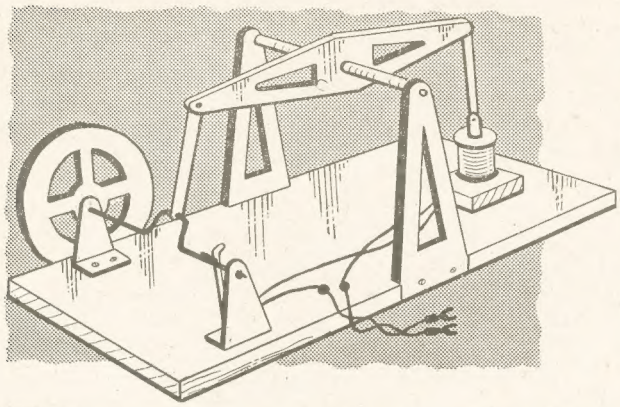


For better effect, and to prevent rusting, give the can a coat of aluminium.

The same idea can be used for other liquid containers that have taps—for oil drums, for example, where leaking contents would foul the floor and surrounding objects.

An interesting model to make is this working

ELECTRIC BEAM ENGINE



THE beam engine was an early form of steam-driven engine and it lends itself well to building up in electrical form. When in motion a model of this kind looks quite effective. The construction is straightforward and should present no difficulties. The completed engine runs from a dry battery or accumulator and can attain quite a high speed.

How The Engine Works

Reference to the illustration will give a good idea of the arrangement of the various parts. As the flywheel and crank axle turn, the overhead beam from which this type of engine derived its name rocks up and down, the plunger moving up and down in its turn in the solenoid (which represents the steam cylinder of the engine).

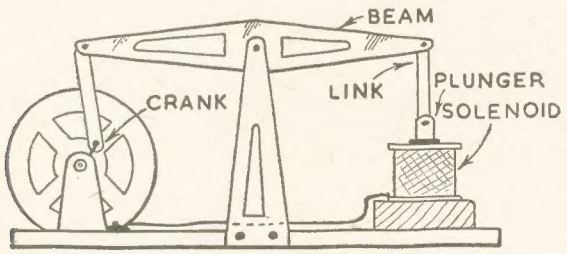


Fig. 2—Side view of the engine

The electrical circuit to the solenoid is completed through a contact screwed to the base which touches a small projection on the axle. This projection is level with the crank and as a result the solenoid is only energised when the plunger is moving down into it. An impulse is consequently given to the crank for approximately half of each revolution, the momentum of the flywheel completing the rotation.

Base and Uprights

Dimensions may be varied considerably, but a base about 9ins. by 4ins. is suggested. It is cut from ½in. thick wood. The two uprights are 4½ins. high and 1½ins. wide at the bottom. A simple triangular shape is cut out to improve appearance and the uprights are screwed into recesses cut in the base.

If desired, the base may be made about 1½ ins. deep by fitting strips all round to form a box which is open at the bottom. If beading is added the appearance will further be improved. The battery used can also be kept from sight in the base thus formed, a cross strip holding it in position.

The beam is cut to the shape shown in Fig. 2 and is about 6ins. long. It should be made from ¼in. thick wood so that a vertical saw-cut is possible at each end, where the connecting links will be pivoted, as shown at (A) in Fig. 3. These links should be cut from thin metal and have a small hole drilled near each end.

Any rough edges should be filed off so that when the links are pivoted in the slots cut in the beam they can move without impediment. A small pin or tack passed through, cut off and turned down, forms the pivot at each end.

At the centre of the beam drill a hole which will provide a tight fit for a length of dowel rod about ¼in. in diameter, and secure with glue. As shown at (E) in Fig. 3, this dowel is pivoted at each of the uprights. Thin nails or screws may be used for the pivots and a small washer should be added each side the uprights to reduce friction. The beam and connecting links should each move with absolute freedom.

The crank axle turns in metal brackets cut from any thin material and bent over at the bottom so that they can be screwed to the baseboard. These brackets should be about 2ins. high.

For the axle, take a length of thick stout wire and bend it carefully into shape with pliers, making the cranked portion about ⅛in. out of line with the remainder (e.g., when the flywheel is turned each end of the beam should move up and down through a distance of about 1in.).

The crank axle should turn smoothly in the bearings and small washers soldered in position or held with a few turns of glued thread on the outside prevent sideways movement. A little free play should be left, however, between washers and bearings.

Before placing the crank axle in position, thread the one connecting link on to it. If the parts are fairly true, the link will run on the crank without difficulty.

The flywheel should be fairly heavy and may be cut from 5 or 7-ply. It should be finished off smooth and turn without wobble. It is a tight push-fit on the axle, but glue may be added to hold it quite secure.

Making the Solenoid

The detail at (D) in Fig. 3 illustrates the solenoid before winding. Each of the end discs is cut from really strong cardboard or thin plywood and is about 1¼ins. in diameter. The central tube should be of thin non-ferrous metal (brass, copper, zinc, aluminium, or similar material).

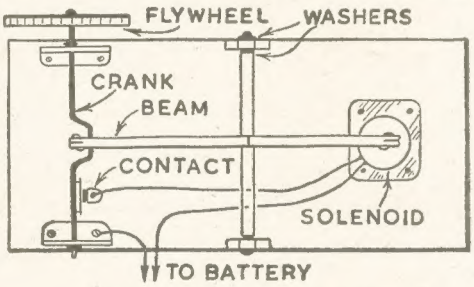


Fig. 1—Plan view of beam engine

It should be about ¼in. in diameter, inside, and can be made by bending a piece of metal round a suitable object. Alternatively, a brass or copper tube may be to hand and something such as a piece cut from the handle stem of an old

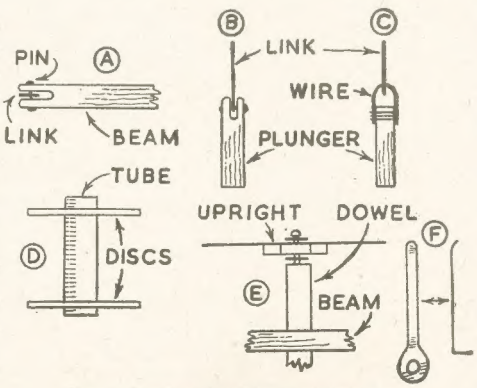


Fig. 3—Further details of construction

bicycle pump is ideal. The discs are a tight fit, glue helping to hold them in place. The tube is about 1½ins. long.

The Bobbin

The bobbin is wound nearly full with 20 or 22 S.W.G. insulated wire, for 4 to 6 volt operation. For 2 to 3 volts, use 18 S.W.G. wire unless full speed is not required. The thinner the wire used, the less current will be consumed, but the speed of the engine will be reduced.

Cover the completed winding with a strip of brown paper and glue the solenoid upright on a small block of wood which can afterwards be screwed to the baseboard. A slight recess should be made in the centre of the block for the lower projecting end of the tube to fit into so that the solenoid can lie quite flat.

The plunger must be of iron and should be an easy sliding fit in the solenoid. A piece sawn from a small iron bolt is suitable. The lower end of the remaining connecting link is pivoted to the plunger. If metal working tools are available, make a saw-cut about ⅜in. deep and then drill a small cross hole for the pivot, as shown at (B) in Fig. 3. If this cannot be done a wire staple may be passed through the hole in the connecting link and then bound to the top of the plunger with glued thread, as shown at (C).

When the flywheel is turned the plunger should move up and down smoothly in the solenoid. When fully down, the bottom end of the plunger should be about level with the bottom of the solenoid tube. When fully up, the plunger should remain in the solenoid for only about ¼in. of its length, or less, and the size of one of the connecting links may need adjusting to arrange this.

Contact and Wiring

One end of the solenoid winding goes to the battery, as illustrated in Fig. 1. The other goes to a contact cut from thin metal and shaped as shown at (F) in Fig. 3. This is screwed near the crank axle (see Fig. 1).

A short length of round metal (such as a small nail with head cut off) is soldered to the crank axle, or held in place by binding at the ends. This is level with the cranked portion of the axle and touches the baseboard contact for nearly half a revolution of the axle. This completes the circuit through a lead taken from one of the axle bearings.

If the projection thus fixed to the axle is opposite the crank, instead of in line with it, the direction of rotation of the model will be changed.

Finishing Off

The model will look best if finished in colour, taking care no paint is put on bearing surfaces. Red, green, blue, silver and black can be used for the various parts, with the base possibly finished with glossy varnish.

For best results, the contact screwed to the baseboard may need a little bending and the idea is to arrange matters so that current only passes through the solenoid when the plunger is moving *into* the tube. Provided all parts move freely the engine should run without difficulty. The great point is to see parts run smoothly and with the least possible friction.

A simple-to-make and easy-to-play little

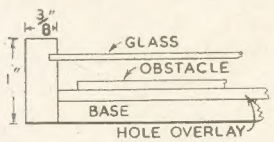
SKILL BALL GAME

THE amusing little game described here is adapted from one that was popular in our grandparent's time. It was then a simple box with a number of holes into which a similar number of small balls had to be rolled. We have made the game much more interesting. The board contains a lot more holes, and a number of obstacles have been introduced, making it more difficult and needing a certain amount of skill to play.

Several people can play the game, the one scoring the highest points winning. The size of the board does not matter a lot, but it should not be made too large. One having 3in. sides would be found most convenient. Therefore, for the baseboard we need a piece of wood 5¼ins. long, 4½ins. wide and ¼in. thick.

Drawing the Hexagon

To work out a hexagon, with a pair of compasses draw a circle having a radius of 2⅝ins., and then without altering them, mark round the circumference



Section of parts

and you will have exactly six points. Join these up and you have a perfect figure. The holes for the balls to roll into are not made in the baseboard but in a separate overlay which is ⅛in. thick. Cut this the same size as the baseboard.

The holes should be drilled before this board is fixed in position. Steel ball bearings 3/16in. diameter are used for the game, so the holes will need to be slightly larger than this.

Smooth Holes

The holes, together with the top of the ⅛in. overlay should be glasspapered quite smooth, after which the part can be carefully glued to the baseboard. Do not put too much glue on or you may block up some of the holes—just a few dabs will be sufficient to hold them together.

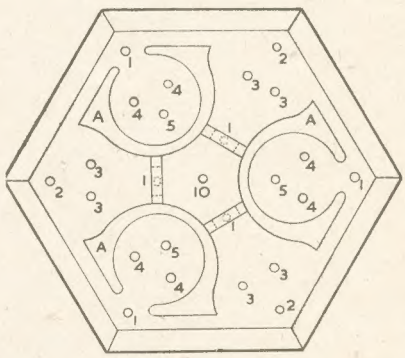
The three pieces marked (A) in the diagram are obstacles to make the game more difficult and are cut approximately to the shapes shown from ⅛in. wood and glued in position. Joining the three obstacles marked (A) are three bridges, which are placed immediately over the holes which record a score of 1.

Bridge Obstacles

The width of the slot in the bridge should not be more than ¾in. and is just sufficient to let the ball pass by the side of this hole. Therefore, in order to reach the highest scoring hole of 10 in the centre of the board, one of these bridges must be negotiated, and it is not at all an easy job.

The numbering of the board should be tackled next. Black paint is used if the baseboard is of a light colour, or white paint if the reverse is the case.

We are now ready to fit the sides to the case. Six pieces of wood just over 3ins. long, 1in. wide and ⅜in. thick are needed. A groove is cut near the top for the glass to rest in and be made a fairly good fit. Mitre the ends, and four of the pieces can be glued in position. A few small panel pins will help to give added strength. When the glue is dry the glass is carefully cut to fit and slide in.



A plan of board and numbered holes

The Balls

The balls are now put in. It does not matter how many you have, although four, or perhaps, five will be quite sufficient to cope with. The two remaining sides can now be fixed in position, and when dry a final glasspaper and coat of polish will complete the job. The aim of each player is to get a big score and miss as many low numbered holes as possible.

Whilst the game is fascinating to play, it can be pleasantly annoying in the endeavour to obtain the highest score, particularly if you play with 'sides' or teams.

Analysis in solution is explained in this second article on

HOME CHEMISTRY

FIRST of all, here are the chemical names of the substances we said you could analyse in the previous article in this series. Table salt—sodium chloride; Glauber's salts—sodium sulphate; blue vitriol—copper sulphate; green vitriol—iron sulphate; sal ammoniac—ammonium chloride; plaster of paris—calcium sulphate. We hope you managed to get them all correct!

Now, passing on to analysis proper there is a system of reactions in solution which enables us to find out which metals are present. Non-metals we will deal with in the next article.

Metals Present

Take the substance you wish to analyse and dissolve it in water. By the way, only distilled water should be used in analysis. Add a little dilute spirits of salts (hydrochloric acid). If either mercury, silver or lead is present you will get a white precipitate.

But how do you know which of those three metals is present? Well, if the ppt. (this is a convenient abbreviation for precipitate), turns violet in light, you have silver chloride. If it dissolves in hot water you have lead chloride. And if it remains unchanged, mercury is present.

Now the ppt. you obtained with hydrochloric acid will only tell whether one or more of these three metals is present. The chloride of any other metal will stay in solution. So, if you do get a ppt. with hydrochloric acid, then you filter off and test the filtrate for other metals.

Routine Procedure

This is the routine procedure all the way along. You add a substance which will ppt. a *group* of metals; you filter, test the ppt. for individual metals and then add a substance to the filtrate which will ppt. another group of metals, and so on.

The following table shows you which substances ppt. which groups of the most commonly occuring metals:—

Precipitating substance	Metals precipitated
Hydrochloric acid	Silver, mercury, lead
Hydrogen sulphide	Copper, tin
Ammonium hydroxide	Iron, aluminium, chromium
Ammonium sulphide	Zinc, nickel
Ammonium carbonate	Calcium, barium

The precipitating substances are used in this order, one after the other. The only other common metals which may be present are magnesium, sodium and potassium. These must be tested for separately because they are not easily precipitated.

All the precipitating substances in the above table can be bought cheaply except hydrogen sulphide. This you must make yourself. You do it with the apparatus shown in the drawing. Remember it is a poisonous gas and must not be generated in a living room unless near an open window. But the smell will probably see to that for it resembles bad eggs!

Before adding ammonium hydroxide to ppt. the iron group, always boil the original filtrate, add a little dilute nitric acid and then a little ammonium chloride solution. And always wash each ppt. on the filter paper with a little water before testing for the individual metals.

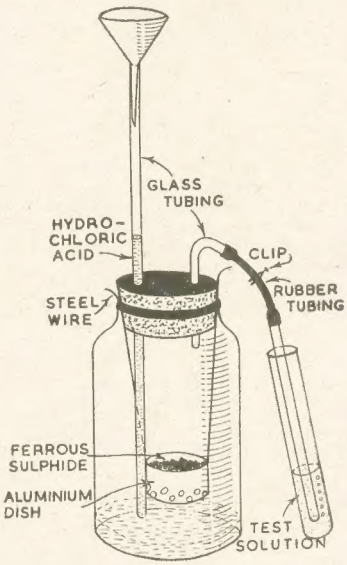
Now, quickly, for the separate metals. Boil the ppt. from hydrogen sulphide with dilute sodium hydroxide and filter. Keep the filtrate and label it (A). Boil the remaining ppt. with dilute nitric acid and add a drop or two of sulphuric acid. Stand a few minutes and add ammonium hydroxide. If copper is present a blue colour appears.

Add some hydrochloric acid to the filtrate (A). If no ppt. forms, tin is absent. If you do, get a ppt. filter and reject the filtrate. Boil the ppt. with strong hydrochloric acid, then dilute with water and filter if necessary. Reject the ppt. Add some pure iron wire to the filtrate and boil. Then add some mercuric chloride. A white ppt. shows the presence of tin.

Mix the ppt. obtained with ammonium hydroxide with water and add a little sodium peroxide. Boil, dilute with water and filter. Keep the filtrate and label it (B). Dissolve the remaining ppt. in boiling dilute hydrochloric acid and then add potassium ferricyanide. If iron is present a deep-blue ppt. forms.

If the filtrate (B) is yellow, chromium is present. To test for aluminium add a large amount of ammonium chloride and stand for a few minutes. A white ppt. shows aluminium is present.

The ppt. formed when you add ammonium sulphide may contain zinc and or nickel. Stir it up with cold, very dilute hydrochloric acid and filter. Keep



the filtrate and label it (C). Heat the remaining ppt. with strong hydrochloric acid and add a piece of solid potassium chlorate. Evaporate to dryness. A yellow residue shows nickel present.

Showing Zinc

Add a little sodium hydroxide to the filtrate (C) and filter if necessary. A white ppt. on passing hydrogen sulphide through the filtrate shows presence of zinc.

After adding ammonium carbonate, dissolve the ppt. in warm dilute acetic acid and add potassium chromate. A yellow ppt. shows presence of barium. Filter, add ammonium hydroxide and ammonium oxalate. A white ppt. shows calcium is present.

The filtrate remaining after addition of ammonium carbonate is tested for sodium and potassium by the flame test described in the previous article. To test for magnesium, add ammonium hydroxide and sodium phosphate. A white ppt. shows presence of magnesium.

(To be Continued)

The worker using cutting tools should rig up

A PEDAL GRINDSTONE

IT is a great advantage to be able to use both hands for grinding tools and other things, but this is impossible when one hand is needed to turn the handle of the grindstone. When two hands are used the job can be held much steadier, which means that a greater degree of accuracy is obtained.

With the aid of the very useful gadget described here, that rather tiresome business of tool grinding can be made a pleasure and the time taken to do the job greatly reduced.

An old bicycle frame supplies the major part of the material required, and by means of a few odd pieces of wood it can be securely clamped either to the side of the workshop wall or fixed in the ground outside.

An old Bicycle Frame

First procure the bicycle frame. You may have an old bicycle that is of no further use as such, or be able to buy one quite cheaply. You do not need the front fork, wheels and handle bars, and these should be removed. The pedals and chain are wanted and also the back wheel axle. The grindstone wheel is mounted on this axle, therefore the spokes must be taken out and the wheel dismantled.

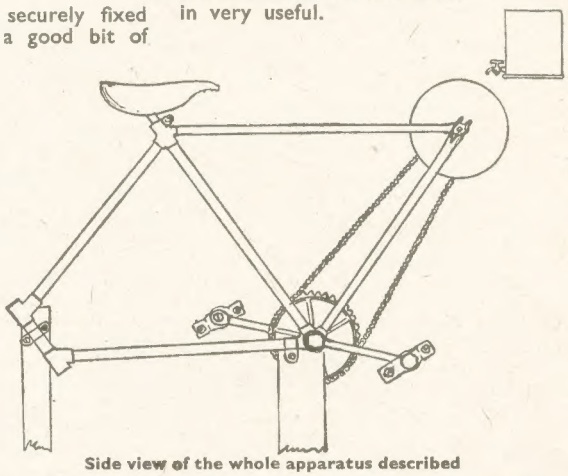
Having got the frame ready fix it securely and mount the grindstone. The rear axle of the frame must be lifted so it is about level with the saddle—there will not be any stooping then, and the task will be easier. The saddle needs turning round to face the grindstone, and the angle altered to bring it level.

Rigid Fixing

The frame must be securely fixed because there will be a good bit of vibration when pedalling quickly. This is best done with odd blocks of wood. If the grindstone is to be outside, a few posts can be driven into the ground and the frame fastened to these, but if it is for use inside the workshop a different method must be adopted.

A block to rest the pedal bearing on and another for the front part of the frame unless it already rests on the floor. Then a few wooden struts fixed to the workshop wall and clamped to the bicycle frame. Whichever method is used see that there is plenty of freedom left for the legs when pedalling.

The grindstone can now be mounted on the rear axle. This job may sound rather difficult, but it is really quite easy. The hole in the stone will probably need opening to fit over the axle, and this can be done by very carefully chipping light taps with a cold chisel. A coarse old file will also come in very useful.



Side view of the whole apparatus described

Be careful not to try to chip too much off at a time or you may crack the stone. It is also very necessary to keep the hole central. When large enough the stone can be fixed on the axle in the same way as a large grindstone—by running lead in to the space.

A bed must be made of plaster of paris to hold the axle upright and to lay the stone on. Test this very accurately to make sure that it is dead upright. Heat some scraps of lead in a ladle or an old tin and when melted carefully pour in and fill up the space. When cold the axle is mounted in the frame and tested. Provided you have done your work carefully and tested for accuracy as you proceeded it should run smoothly and without any wobble.

Wetting the Stone

For most grinding jobs it is necessary to keep the stone wet, and this can be done very simply. A can is stood on a platform fixed over the stone. Solder a small tap near the base of the can so the rate of drip can be easily adjusted.

When pedalling at high speed it is an advantage to have a pad of felt or rubber lightly touching the wheel to prevent the water from splashing the operator.

Besides its use as a grindstone our pedal operated machine has many other possibilities open for development. It could, for instance, be used for polishing with a leather faced wooden disc or a wool or calico mop. There is no reason also why it could not be used to drive a small circular saw to cut thin wood.

Improvised Water Fount

WATER must always be available for one's pets and livestock, but where small vessels are used it may not be convenient to replenish the supply as often as necessary. The inverted jar method provides a cheap and efficient solution to the problem.

For those not acquainted with it, the idea is to fill a jam jar or bottle with water, cover with a saucer or other fairly shallow vessel suitable for the birds or animals to drink from, and turn the whole quickly upside down. By raising the jar slightly from the bottom of the saucer the water will flow in and remain at a constant level, filling up from the bottle as the saucer is emptied.

The height of the water in the trough will depend on the height of the bottle neck from the bottom, but it must not, of course, come above the saucer rim or the whole lot will run away. Two strips of wood will serve to keep it raised.

A large jam jar would stand firm for small birds or chicks. But if a narrow necked bottle is used, or if the trough is for larger livestock likely to knock it over, the fount will need attaching to the wall or other support. Some fastening is really desirable whatever the size of animals or birds using it, and it should be easy to arrange a couple of strong wire hoops or similar contrivance which can be quickly detached when the jar needs refilling.

* * *

When Using a Saw

REMEMBER that a saw has teeth the whole length of the blade. So, after making an entry into the wood, let them all have a share of wear—and at the same time do the job more efficiently and easily—by using long even strokes. Do not make short quick jabs, do not be too hurried, and do not press too heavily.

Starting the cut neatly is sometimes a difficulty for the novice, the solution here being to get the saw going with a few preliminary light upward strokes, then the down stroke, and carry on. Finishing the cut may also prove rather difficult for a beginner, the final stroke or two causing jagged splinters as the pieces separate. Here again, a light careful touch will ensure clean work.

A guide line is essential for making a straight course across the wood, though often a bigger difficulty for amateurs than cutting straight across is cutting squarely downwards, the divided pieces coming away with sloping instead of square edges. A critical eye must, therefore, be kept on the blade to check any tendency to incline it either to left or right.

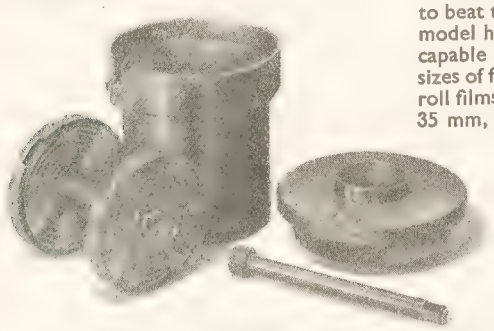
The Craftsman.

Photographers can avoid mess and mistake by undertaking

TANK DEVELOPMENT

IF we assert that photography can be undertaken without mess or mistakes and it creates any doubts in your mind or makes you desirous of arguing with the author, then send along any points about which you are uncertain and ask for an explanation. But, before doing so, it is most important that you read through to the end and follow out the instructions very carefully.

By doing this you will almost for certain agree that it is possible to practice the hobby of photography without mess or mistakes and will conclude that those of the past have been very largely due to your own carelessness.



The parts of the developing tank

Let us tackle the question of 'mess' first. In the course of many years experience of demonstrating and lecturing on this very interesting subject of amateur photography, the author has been up against such remarks as 'Oh, I must not do any of the chemical business at home, it makes such a mess' or, 'We have not a spare room and I could not do the work in the bathroom' or 'It's such a messy job requiring a lot of chemicals and apparatus' and many other similar comments and excuses.

Now, the answer given to each and every one is 'Whenever I go on holidays or away from home the camera invariably accompanies me and in the kit-bag is a small bottle of developer, a small tin of fixing salt and a developing tank. As soon as a film is exposed for its full complement it is developed, and no landlady or hotel manageress has yet raised any complaints about a mess; the obvious reason being that no mess has ever been left.

Remember Cleanliness

No! It is not that any great care is taken in the process. Cleanliness is a very great factor in successful photography and it pays a jolly good dividend in more ways than one.

There is no reason at all for any of these excuses, as everyone will prove for himself if the following suggestions are adopted. You know that the author has always advocated doing your own developing and printing, and contends that that is the surest way of avoiding mistakes and getting 100 per cent successful negatives.

You will have noticed that a 'developing tank' is always placed in the kit-bag when we go away. About 18 months ago Johnsons put a new one on the market. It was called the J20 tank. A postcard brought a copy of the booklet and it was not many days before one of the tanks became a constantly used part of the equipment.

Recent Improvements

Every tank that has been invented has been given a good trial, but this little and well-designed piece of apparatus appears to beat them all. Hitherto the adjustable model has been regularly used. It is one capable of adjustment to take different sizes of films, including Nos. 16, 20 and 27 roll films, and also 36 exposure lengths of 35 mm, and about 60ins. of 16 mm film. All this is distinctly a great advantage to a possessor and user of more than one camera.

To those, however, who have to be satisfied with one camera, taking a No. 20 film, the J20 tank is just ideal. It is small and compact. The spiral film holder is in one piece, i.e., no adjustment is necessary. It requires only a minimum amount of solution, 10 ounces. Further, there is an improvement in the lid which locks more easily and surely by giving it a slight turn, and the opening in the centre is more deeply set and is capable of receiving a small tube thermometer for testing the temperature of the solution.

The Scientific Way

Some of you readers may want to know why is it necessary to have a tank for developing a film? Why not do the work in a dish or basin? It is not necessary but, if you want to avoid mess and mistakes there is no better or more scientifically accurate way than with a tank and using the time and temperature method. It is simplicity itself and is in use by all classes of photographers—professionals, trade printers and amateurs everywhere.

Time and temperature developing is based on the fact that every brand of film has a definite time for correct development. This time only varies by altering the strength or temperature of the solution. Therefore, if you only use one make of film and one particular standard developing solution at, we will say, the usual 65 degrees fahrenheit, you can be sure that you will get the best results out of the exposures if you allow the film to remain in the developer for the recognised time. This time is to be found in the tables included with each bottle or packet of developer.

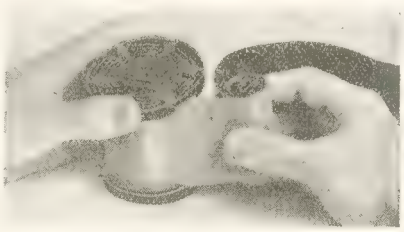
Come and see what happens when a No. 20 film is ready to be processed. It is not quite dark in the bedroom, so prepare to load the film into the J20 tank by putting the sections under the bed clothes. Then slit the paper cover of the spool and, taking this in the right hand, dive under the clothes and take the spiral in the left hand.

It requires a little patience to slip the end of the film into the first groove but it soon goes quite easily and the paper cover just slips away while the whole of the film is being wound into the wheel. When the end of the film is reached the paper cover is torn away and the wheel with the film is placed in the tank. The lid is slipped on, and, with the slight twist, the whole is locked and made light tight. The apparatus can now be handled in daylight.

Solutions

The next item is to prepare the solutions. For these, it is a simple matter to borrow a couple of orange or lemonade bottles holding about 25 ounces of solution. As there are likely to be five or six spools requiring developing during the next few days it is advisable to mix sufficient solution. So, taking 1 ounce of Azol, diluted with 24 ounces of water, it is placed in one bottle, and in the other, 2 ounces of fixing powder is dissolved in 15 ounces of water.

Do not forget that most tumblers hold 10 ounces and it is not difficult to measure the required amount of water. This preparation of solutions is done



Loading the film into the tank

over the wash bowl in which there is a small quantity of water, just in case a few drops of chemical solution is inadvertently spilled. The water will prevent staining or mess.

The film in use is an Ilford H.P.3, and the temperature of the developer is 65 degrees. So, on referring to the Azol booklet, it will be seen that this film is in group 6 and at 65 degrees with Azol one part, and water 24, the time of development is 11½ minutes.

Before pouring in the developer, fill the tank with water and give the film a twist with the spindle. Then after a couple of minutes pour the water away. This is one means of preventing airbells and it ensures that the whole surface of the film is in the best condition to be

acted upon evenly by the chemicals. Turn to your watch and take note of the time when the solution has been poured in and development starts. At several intervals give the spindle a twist to keep the solution agitated.

For Depreciation

At the end of the 11½ minutes pour the developer through the mouthpiece into the stock bottle of developer solution and replace it with the fixing bath. The next time the Azol is used it will be advisable to slightly increase the time of development. About 10 per cent each time is satisfactory, provided not too much time is allowed to elapse between each subsequent spool.

The made-up stock of 25 ounces is usually satisfactory for at least four spools, but it is a great mistake to attempt to economise a penny or twopence on developer solution and risk spoiling a whole film of exposures, which possibly cannot be repeated. Assuming that the holiday period is two to four weeks and the number of spools four or five then the 25 ounces of developer should suffice. The same applies to the fixing solution.

There you have a complete description of how to avoid 'mess and mistakes' and, at the same time the author has endeavoured to describe what is now considered the best, most correct, and simplest way of developing any spool.

During fifty years experience of processing plates and films the writer has long since discarded all the old methods and is convinced that by using a tank and the time and temperature method a greater percentage of successful negatives has resulted.

Ready for the Summer

This article has been specially written for this issue of *Hobbies Weekly* for two main reasons. The first is because many readers may still be in possession of some cash left over from their Christmas presents and would welcome the opportunity of buying a J20 tank. The second reason is that at this time of the year you will be able to make some first experiments and be so fully experienced when the holidays come along. The fact that no darkroom is required will help and it will start you on the right track of doing your own developing and so give you a far greater interest in the hobby.

The Best Results

In conclusion it is as well to anticipate one query which may have occurred to some. It is a very usual one. If a spool of 8 or 12 exposures has one or two under- or over-exposures what happens to them if the whole of the film is developed to a given time?

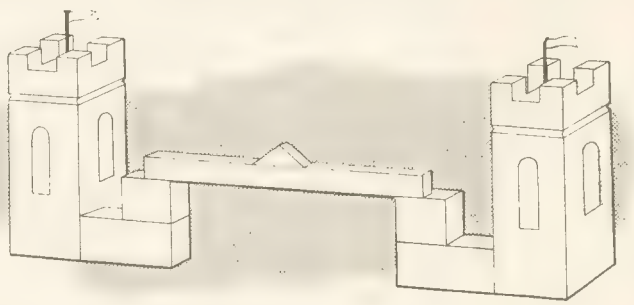
The answer is that 'By correctly developing the under- and over-exposures you have got the best out of them. Reducing or increasing the development time for those errors of exposure would not make perfect negatives of them. Nothing will do that although some might be improved by the usual "after treatment", methods such as intensification or reduction'.

READERS may like early notice of an Exhibition being held next March by the Northern Association of Model Engineers. This will be held at the Corn Exchange, Manchester, and those wishing to participate should write to The Hon. Sec., 9 Ravensway, Bury Old Rd., Prestwich, Lancs., for particulars.

A simple method telling how a reader made a

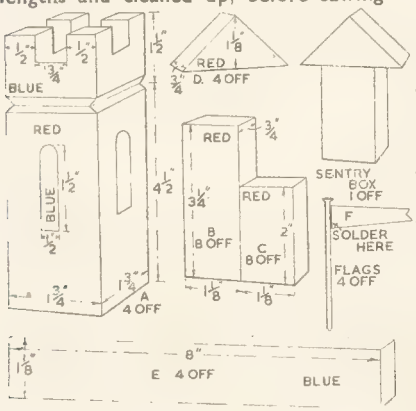
WOOD BLOCK TOY FORT

HERE is another idea (suggested by a Scottish reader) for a toy where accuracy is unnecessary, so that a boy could make it for a younger brother. His own kiddy has played for hours with this Fort and it is surprising how many different designs can be arranged. The actual work occupied only one afternoon.



Details

The four towers (A) were made from a length of 1¾in. square post cut into 6in. lengths and cleaned up, before sawing



Showing the parts and number needed

away the waste portions at the top. The next step is to cut away the windows and a V section to give shape to the tower top. To finish the tower paint the top with blue ink, and the bottom with red. Quite simple, quick and very effective, although paint is preferred in case the child happens to put it in the bath.

The parts (B), (C), and (D) are cut from a piece of ¾in. by ¼in. wood, and once more cleaned up, hence the odd size of 1⅛in. width. This, however, is unimportant as the whole job can be made from scraps. To simplify the building, glue the parts (B) and (C) together and secure with a panel pin although this is again unnecessary if the boy can tackle the building of so many pieces. Once more red ink can be used for the colouring of the parts.

Flags

The flags (F) are cut from a piece of a cocoa tin, but any of the thin tins in use today can be cut easily to the shape required. The tin pennants are then soldered to 3in nails, and to cover the crude head of the nail, a blob of solder will suffice. The pennants are painted to any design, making sure the colours are bright. The tin is bent slightly to give the impression of a windy day.

A $\frac{3}{16}$in. hole is then drilled in the top of each tower for a depth of about 1in. and the flags inserted. The pieces (E) are cut from a piece of 1¼in. by ½in. wood, approximately 8in. long, cleaned and painted blue.

Sentry Boxes

The sentry box (or boxes) if required, are made of pieces (C) and (D) (one each for one sentry box) and painted as you wish. The whole job is then assembled. Assemble one unit only for a start, as illustrated, and you will soon see that the fort can be made as a square or elongated to the length of the table as a background to soldiers, guns or other toys. Thus this is a toy in itself, as well as one merging with other toys.

MISCELLANEOUS ADVERTISEMENTS

The advertisements are inserted at the rate of 3d. per word prepaid. Name and address are counted, but initials or groups, such as E.P.S. or £1/11/6 are accepted as one word. Postal Order and Stamps must accompany the order and advertisements will be inserted in the earliest issue. Announcements of fretwork goods or those shown in Hobbies Handbook are not accepted. Orders can be sent either to Hobbies Weekly, Advert. Dept., Dereham, Norfolk, or Temple House, Temple Avenue, London, E.C.4

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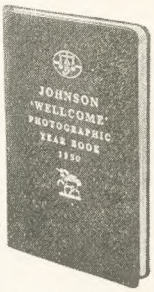

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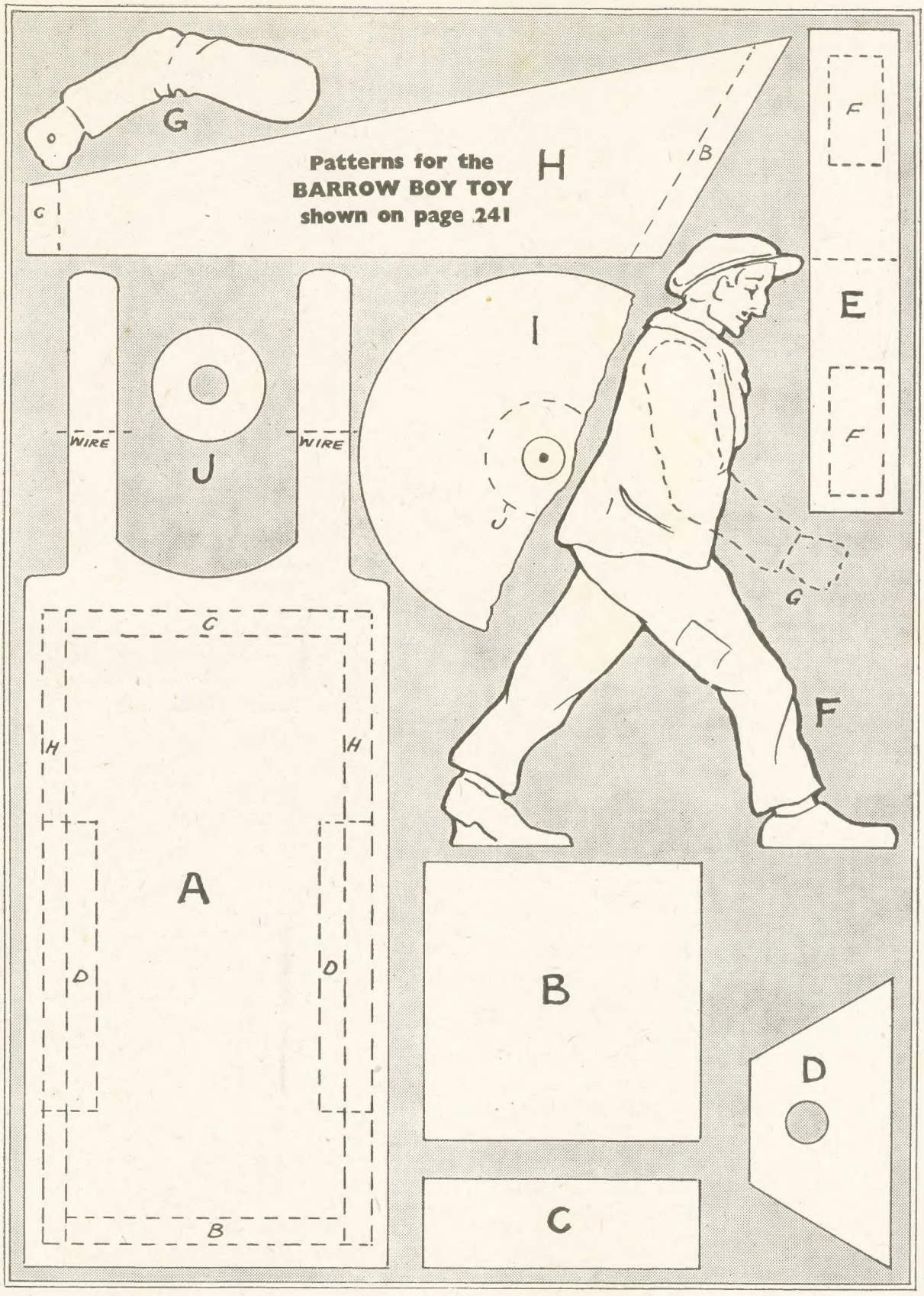
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